Eddy
User's Guide

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Chapter 1. Introduction

This chapter is an introduction to SystemBase embedded device server Eddy series and this document.

1. About This Document

This guide is designed for users of Eddy, who are in charge of connecting to and communicating with Eddy, setting Eddy's configurations, status monitoring, firmware update, and other administration work.

2. Who Should Read This Document?

This guide is designed for Eddy users and administrators. It is strongly recommended that anyone trying to apply, use, and maintain Eddy read this document. This guide deals with the hardware-level integration issues and software-level configuration tips. It will be a great starting point for any administrators who want to easily monitor and control Eddy and its connected devices.

3. Document Structure

Introduction (Chapter 1) is a preface with general information and introductory notices.

Getting Started (Chapter 2) gives a brief introduction to Eddy series, including features and applications.

Hardware Descriptions (Chapter 3) explains about the layout and pin specifications with block diagram and drawings.

Integration (Chapter 4) helps you to connect Eddy to serial and network environment. It ends up with first time boot-up and status check.

Configuration via Web (Chapter 5) provides menu-by-menu guide for setting up the operation environment for Eddy via web browser.

Configuration via Telnet (Chapter 6) provides a list of commands for setting up the operation environment for Eddy via Telnet.

Appendix (Chapter 7) provides firmware update guides and technical specifications for detailed information.

4. Eddy Documents

The following table summarizes documents included in the Eddy document set.

Document Name	Description
User Guide	Integration, configuration, and management tasks are explained for the administrator
Programmer's Guide	Programmer's application development guide, including in-depth approach to compiling, linking, and firmware/application generation API reference manual is also included with a list of available functions and structures for customized application programming (only for Eddy-1/Pin Pro)
Portview User Manual	Guide for SystemBase device server management application Portview
COM Port Redirector User Manual	Guide for SystemBase COM Port Redirector

If you need brief information on Eddy or embedded device servers in general, please visit our company website at http://www.sysbas.com/. You can view and/or download documents related to Eddy as well as latest software and firmware updates. Available resources are as follows:

Document Name	Description
Eddy Spec Sheet	Specifications for Eddy products
Eddy White Paper	An easy reading for anyone new to embedded device server. Deals with background and technology Past, present, and future of embedded device servers along with the overview of market environment
Eddy Application Notes	Various applications of Eddy presented in diagrams and images

All documents are updated promptly, so check for the recent document update. The contents in these documents are subject to change without any notice in advance.

5. Technical Supports

There are three ways you can get a technical support from SystemBase.

First, visit our website http://www.sysbas.com/ and go to 'Technical Support' menu. There you can read FAQ and ask your own question as well.

Second, you can e-mail our technical support team. The mail address is tech@sysbas.com. Any kind of inquiries, requests, and comments are welcome.

Finally, you can call us at the customer center for immediate support. Our technical support team will kindly help you get over with the problem. The number to call is 82-2-855-0501 (Extension number 225). Do not forget to dial the extension number after getting a welcome message.

Chapter 2. Getting Started

Welcome to Eddy! This chapter includes Eddy series overview, main and distinctive features, package contents for each product, and application fields.

1. Overview

Eddy series consists of 2 products: Eddy-1/Pin and Eddy-1/Pin Pro. Eddy-1/Pin Pro supports programmability while Eddy-1/Pin doesn't.

Programmability

1) Programmable

Description: You can program and download your own application on the module.

Products: Eddy-1/Pin Pro

2) Non-programmable

Description: Application built-in, plug-and-play type module

Products: Eddy-1/Pin

There is also Eddy-1/Pin DK, a development kit for helping programmers easily test their applications and operations of Eddy. The kit includes evaluation board, all necessary connectors, and programming environment with documentations and guidelines.

Selection Guide

	Eddy-1/Pin	Eddy-1/Pin Pro
CPU	32-bit ARM9 Core	
Flash	4MB	
SDRAM	8MB	
Serial Interface	RS232/422/485 (Selectable with Pins)	
Serial Connector	24-Pin Header (10+14)	
Serial Speed	Max 921.6Kbps	
LAN Interface	10/100Mbps Ethernet	
LAN Connector	RJ45 with Embedded Transformer	
Dimensions	55 * 38 mm	
Weight	19g	
GPIO	4 Programmable I/O Pins	
Power Input	3.3V	
Power Consumption	260mA	
Programmable	No	Yes
SystemBase SDK/API	No	Yes

2. Features

Various features of Eddy make it a universal yet distinctive embedded solution. Here we present main features of Eddy series. Others will explicitly appear throughout this guide.

- Premium-level hardware with ARM9 168MHz CPU, 4MB Flash, and 8MB SDRAM
- Pin selectable RS232/422/485 interfaces
- Max 921.6Kbps serial speed
- Program and run your own application (Eddy-1/Pin Pro)
- SystemBase SDK and API support for application programming (Development Kit)
- Small size to fit in any hardware
- 10/100Mbps Ethernet port with transformer
- SystemBase COM Port Redirector for better adaptability
- Extensive configuration and monitoring with Portview
- Firmware upload with Web, FTP, and TFTP
- Configuration with Web, Telnet, SNMP, and Portview
- Lots of customizing options
- Standard Linux environment for openness in executable applications
- 4 Programmable IO for customized applications

3. Package Checklist

Eddy package is composed of following components. Make sure every component is included with your package.

Module

All module packages include a module and a CD with utilities and documents.

Eddy-1/Pin: Eddy-1/Pin module and a CD

Eddy-1/Pin Pro: Eddy-1/Pin Pro module and a CD

Development Kit

Eddy-1/Pin Evaluation Board

Board Supporters

Serial Cable 1pc (null modem cable)

Cross LAN Cable 1pc

USB Cable 1pc (for firmware download)

Power Adaptor 1pc

Power Cable 1pc (Euro or US – selectable in order)

CD (SystemBase SDK, compile environment, documentations, etc.)

4. Applications

Eddy can be applied to many practical applications in various fields. Here we present some of them.

Factory / Industrial Automation

PLC, Robot arms, Human-Machine Interface, Warehouse rails

Medical instruments, Inspection equipment controllers

Alarming units

Home Appliances / Electronic Devices

Power controller, Gaming machines

Scales, Gas detection units, Water & pollution metering devices

Data collection and distribution units

Financial / Building Automation

Card readers, Barcode scanners, Kiosks, Point-Of-Sale related devices

Serial printers, Cash registers, Credit card authorization terminals

Biometric detection units, Security devices

OEM Device Server Distributors

OEM device server with distributor's own case & brand

Ready-to-go device or customized application / setup mode can be inserted

Chapter 3. Hardware Description

This chapter provides Eddy's hardware information, including block diagram, layout, pin specifications, dimensions and other hardware-related issues.

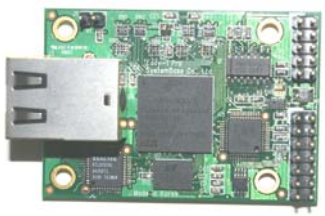
1. Eddy-1/Pin & Eddy-1/Pin Pro

Eddy-1/Pin and Eddy-1/Pin Pro have identical hardware specifications. They are only different in the software level.

Picture

Side View 1

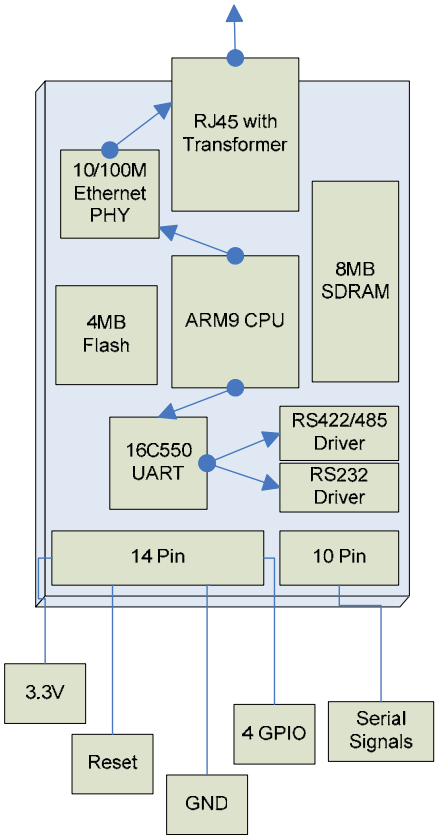
Side View 2



Top View

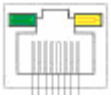
Bottom View

Block Diagram



LED

RJ45 Ethernet port has two LEDs for displaying status.



Left LED:	100Mbps Link
Right LED:	LAN Tx

Pin Specifications

1) Pin Header

- RS232

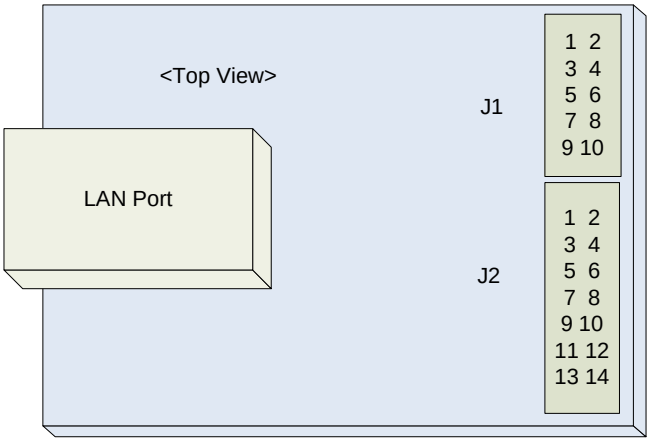
J1			
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	USBN	10	USBP

- RS422

J1			
1		2	RX+
3	TX+	4	
5		6	RX-
7	TX-	8	
9	USBN	10	USBP

- RS485

J1			
1		2	
3	TRX+	4	
5		6	
7	TRX-	8	
9	USBN	10	USBP



J2			
1	INF_1	2	3.3V
3	INF_0	4	3.3V
5	TR1	6	TR0
7	RDY#	8	RST#
9	GND	10	GND
11	PIO3	12	PIO2
13	PIO1	14	PIO0

J1 Pin Description

1	DCD	RS232 Signal (Data Carrier Detect)
2	RXD	RS232 Signal (Receive Data)
3	TXD	RS232 Signal (Transmit Data)
4	DTR	RS232 Signal (Data Terminal Ready)
5	GND	RS232 Signal (Signal Ground)
6	DSR	RS232 Signal (Data Set Ready)
7	RTS	RS232 Signal (Ready To Send)
8	CTS	RS232 Signal (Clear To Send)
9	USBN	USB data line for firmware upload (Only for development purpose)
10	USBP	USB data line for firmware upload (Only for development purpose)

RX+ RS422 Signal (Receive Data +)

TX+ RS422 Signal (Transmit Data +)

TX- RS422 Signal (Transmit Data -)

RX- RS422 Signal (Receive Data -)

TRX+ RS485 Signal (Transmit/Receive Data +)

TRX- RS485 Signal (Transmit/Receive Data -)

J2 Pin Description

1	INF_1	Serial Interface Selector 1
2	3.3V	Power In
3	INF_0	Serial Interface Selector 0
4	3.3V	Power In
5	TR1	Terminal Resistor
6	TR0	Terminal Resistor
7	RDY#	Ready LED Out
8	RST#	External Reset In
9	GND	Signal Ground
10	GND	Signal Ground
11	PIO3	Programmable IO 3 (user defined)
12	PIO2	Programmable IO 2 (user defined)
13	PIO1	Programmable IO 1 (user defined)
14	PIO0	Programmable IO 0 (user defined)

2) Serial Interface Selection

Since Eddy supports on-board selection of RS232 / RS422 / RS485, and each interface can be configured by a combination of INF_1, INF_0, and TR signals.

	INF_1	INF_0	Terminal Resistor
RS232	OFF	OFF	OFF
RS422	OFF	ON	USER
RS485	ON	OFF	USER

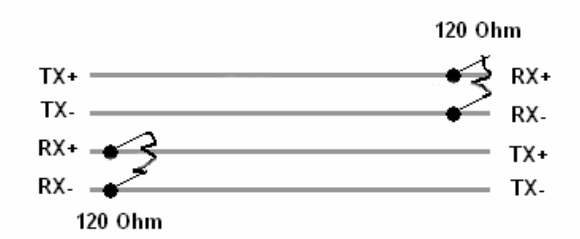
3) Terminal Resistor

Terminal Resistors are installed in RS422 or RS485 communication to prevent noise and distortion of long distance data transfer. They help by matching impedance in communication line, and normally 120 ohm resistors are used. Since the use of terminal resistor is the decision of users, in Eddy series, user can either install or not install terminal resistors in RS422 or RS485 mode. Installation can be done by connecting TR0 and TR1 pin on J2 pin header to the resistor. Usual configuration for these pins is to use a jumper to connect both pins and control from one switch.

Here is a guideline for installing terminal resistors.

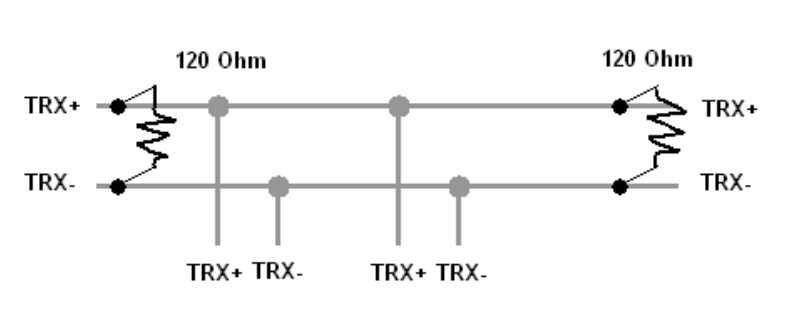
RS422

Install terminal resistors at each end (terminal).



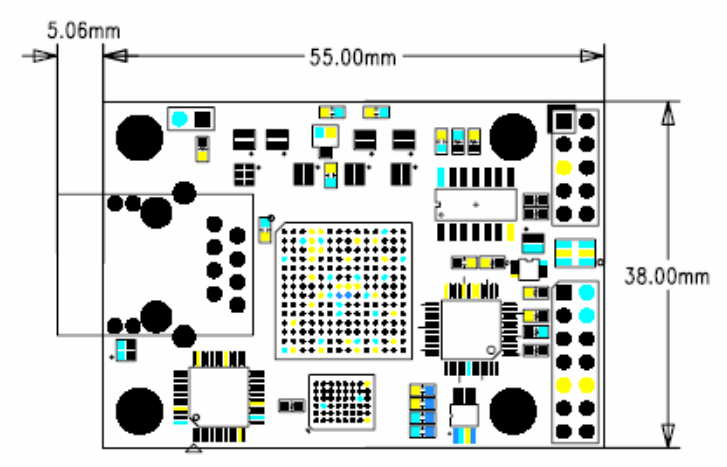
RS485

Install terminal resistors only at each end (not in the middle ones in Multi-Drop structure)

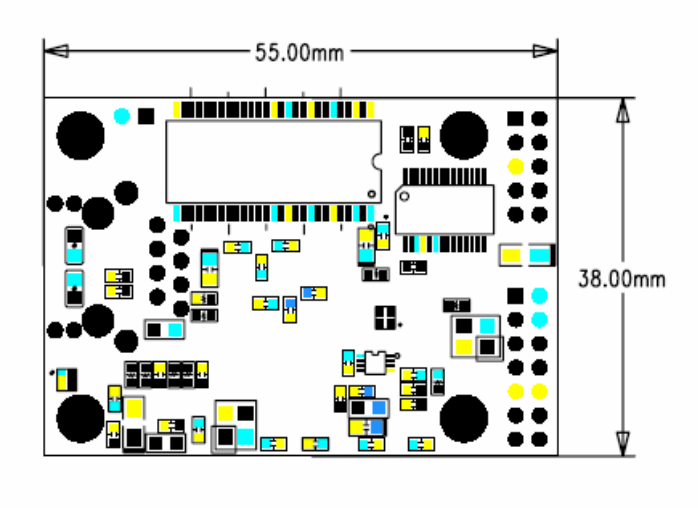


Dimensions

Top View



Bottom View



Chapter 4. Integration

This chapter explains how you can make Eddy to communicate. It deals with LAN and pin header connection guides for Eddy to operate together with the target serial device.

1. Eddy-1/Pin & Eddy-1/Pin Pro

Follow these steps to connect Eddy to the device and network.

Assemble Guide

1) LAN

In order to connect Eddy to network, you need to use RJ45 Ethernet port. It supports both 10Mbps and 100Mbps Ethernet connection (auto-sensing). Plug one end of a **cross LAN cable** to Eddy and the other end to a hub, switch, or any other network device that can provide you with network access.

2) Pin Header

In order to connect Eddy to an external serial device, two pin header cables are required. One should have 10 pins, and the other should have 14 pins. Serial and power lines are included in these 24 pins. For pin specifications, please refer to Chapter 3. Hardware. Please note that not all 24 pins must be used. You can selectively connect only those pins relevant to your application.

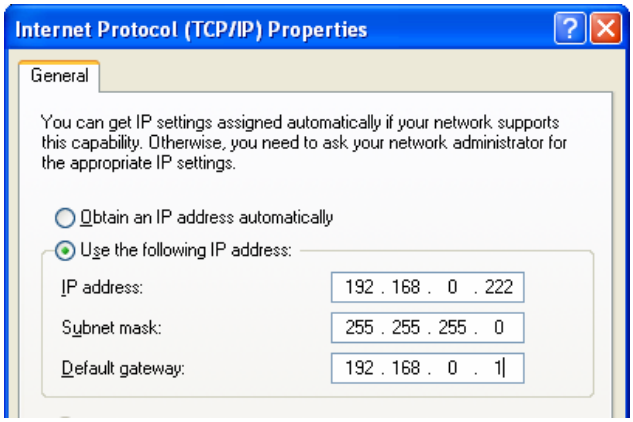
First-Time Bootup

If the **3.3V power** (Please note that it is not 5V) has been successfully supplied from the pin header, Eddy will power on and start booting. It is a good practice to connect both pin 2 and pin 4 of J2 as power pins for better stability. Although there is no power LED to check the status, you can check by LEDs on the RJ45 Ethernet port. LED status operation is described in Chapter 3. Hardware.

An IP address is required to access Eddy's web interface or telnet command-line configuration tool. By factory default, Eddy is assigned a static IP address. After the initial connection, you can either manually assign a different IP address or set Eddy to automatically get an IP address from a DHCP server. While this depends on your network environment and policy, **it is strongly recommended that you assign Eddy with a unique static IP.**

The factory default IP address: **192.168.0.223**

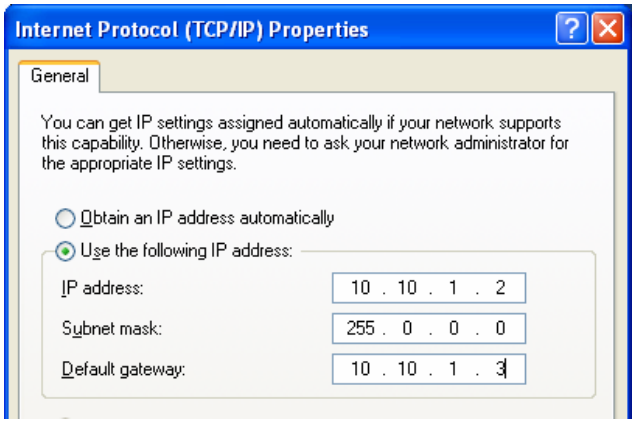
Eddy's default IP address is set to 192.168.0.223. In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 192.168.0.223. Please refer to an example below, and note that values doesn't necessarily have to be identical to the example below.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 0 . 222
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
192 . 168 . 0 . 1

In case you configure Eddy to use DHCP to obtain an IP address automatically, you might find it hard to know the IP address to connect to. To provide users with an easier way to know the current IP address, Eddy has a fixed alias IP that is always accessible. Use the address below whenever you cannot find out Eddy's IP address.

Factory default alias IP address: **10.10.1.1**

In order to connect with this address, you need to change network configurations so that your PC can connect to the IP 10.10.1.1. Please refer to an example below, and note that values doesn't necessarily have to be identical to the example below.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
10 . 10 . 1 . 2
Subnet mask:
255 . 0 . 0 . 0
Default gateway:
10 . 10 . 1 . 3

Now you are ready to connect to Eddy! There are three options to configure Eddy.

Web: You can easily configure Eddy with web interface, accessible from any web browser. For more information, please refer to Chapter 5. Configuration via Web.

Telnet: You can configure Eddy with commands after accessing Eddy through Telnet. For more information, please refer to Chapter 6. Configuration via Telnet.

Portview: You can use a Windows-based utility Portview from SystemBase to monitor Eddy. For more information on using the utility for your administration purpose, please refer to Portview User Guide.

Chapter 5. Configuration via Web

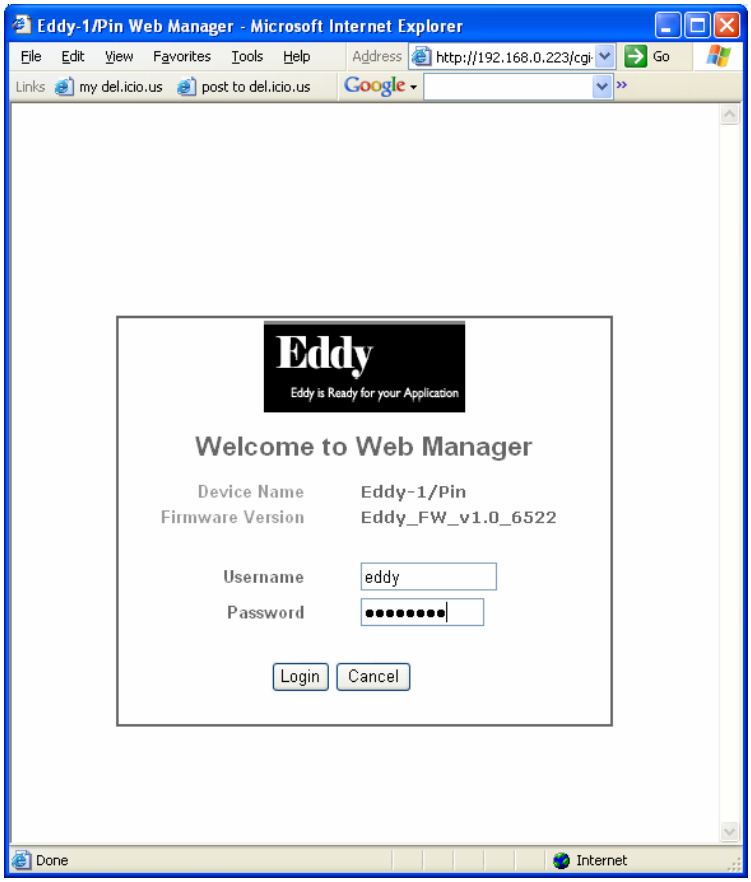
1. Connection

Open your favorite web browser and enter the IP address of Eddy to access Eddy's web manager. Once you are successfully connected, the following front page will show up. You need to enter appropriate username and password to login.

Please note that this username and password is used as authentication method for Telnet as well. This means if username or/and password has been modified from the web interface, modified values have to be entered to connect to Telnet, and vice versa.

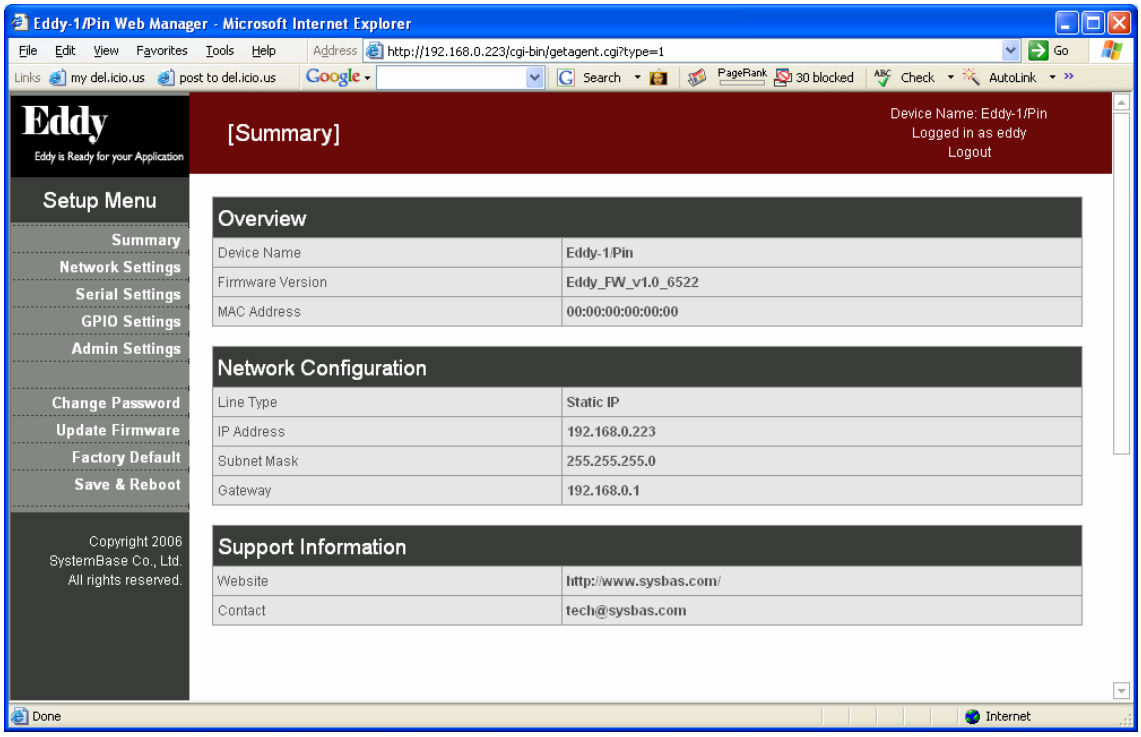
Factory default username: **eddy**

Factory default password: **99999999**



2. Setup Menu

If login process is successful, you will see a web manager's main page, showing summary of your device. On the left, you will see a setup menu, and you can navigate through these options.



Summary : View a summary of Eddy.

Network Settings : Configure network connection settings.

Serial Settings : Configure detailed operation environment for serial communication.

GPIO Settings : Configure programmable I/O pins.

Admin Settings : View and change device information and support information.

Change Password : Change ID and password for both Web and Telnet interface.

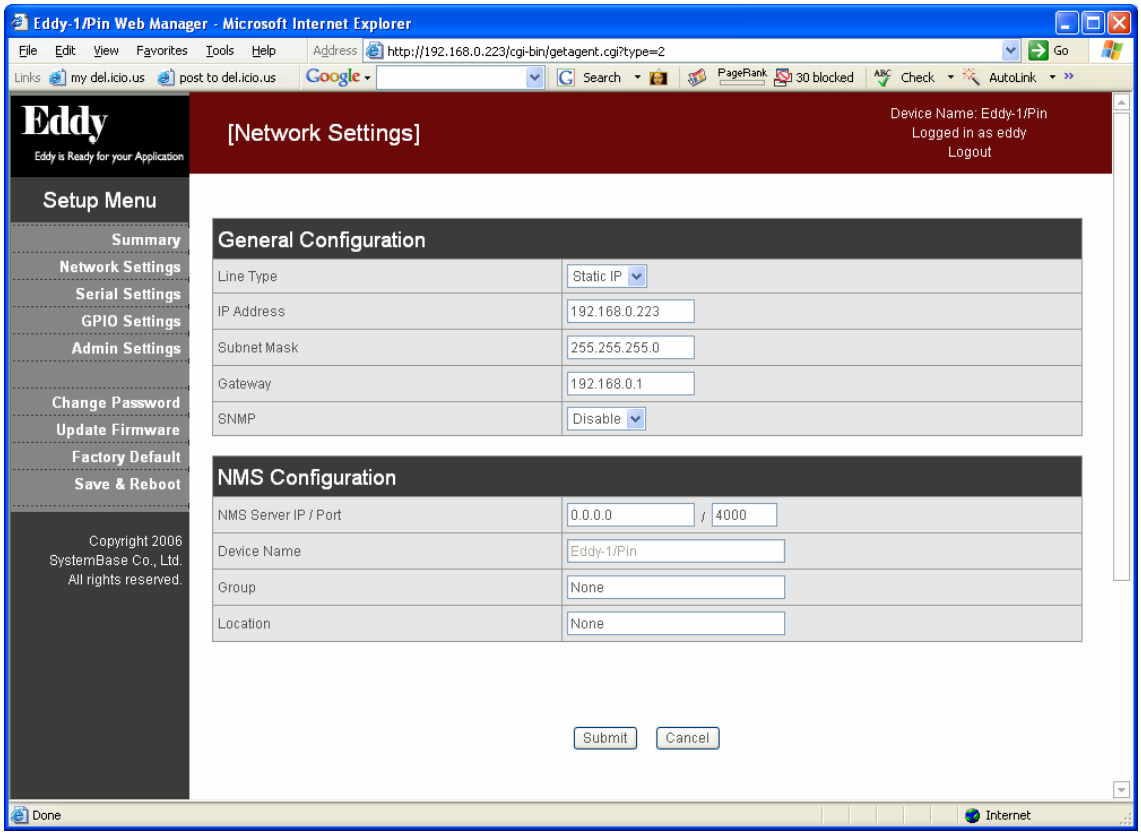
Update Firmware : Update Eddy's firmware.

Factory Default : Restore all the factory default settings.

Save & Reboot : Save the configurations and reboot Eddy.

3. Network Settings

Configure general network environment and network management. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to '**Save & Reboot**' in order to see these changes in effect. Changes will be discarded if you do not save current settings.



General Configuration

- **Line Type** (Default: Static IP)

  Options: Static IP / DHCP

  IP obtaining method for Eddy's network connection

- **IP Address** (Default: 192.168.0.223)

  Current IP address Eddy is assigned to.

  When line type is Static IP, manually enter an appropriate IP address.

  When line type is DHCP, current IP is displayed, but it is not editable.

- **Subnet Mask** (Default: 255.255.255.0)

  Current subnet mask Eddy is assigned to.

  When line type is Static IP, manually enter an appropriate subnet mask.

  When line type is DHCP, current subnet mask is displayed, but it is not editable.

- **Gateway** (Default: 192.168.0.1)

  Current default gateway Eddy is assigned to.

  When line type is Static IP, manually enter an appropriate default gateway.

  When line type is DHCP, current default gateway is displayed, but it is not editable.

- **SNMP** (Default: Disable)

  Options: Enable / Disable

  Enable or disable SNMP(Simple Network Management Protocol) support.

  MIB-II (RFC 1213): System, Interface, IP, ICMP, TCP, UDP

  MIB-I (RFC 1317): Serial Interface

NMS Configuration

If multiple devices are installed and managed together, integration in management is necessary. In addition, it is often the case when the device reports an erroneous status, figuring out the reason for the failure becomes a time-consuming job. To solve this inefficiency and provide better solution, Eddy includes a Network Management System software, Portview.

- **NMS Server IP / Port** (Default: 0.0.0.0 / 4000)

  Set the IP address and the port number of the PC where Portview in installed. For more information on Portview, please refer to the Portview User Manual.

  If IP is set to 0.0.0.0, NMS feature is disabled.

- **Device Name** (Default: Eddy-1/Pin)

  Set the device name for management. 32 Characters at maximum.

- **Location** (Default: None)

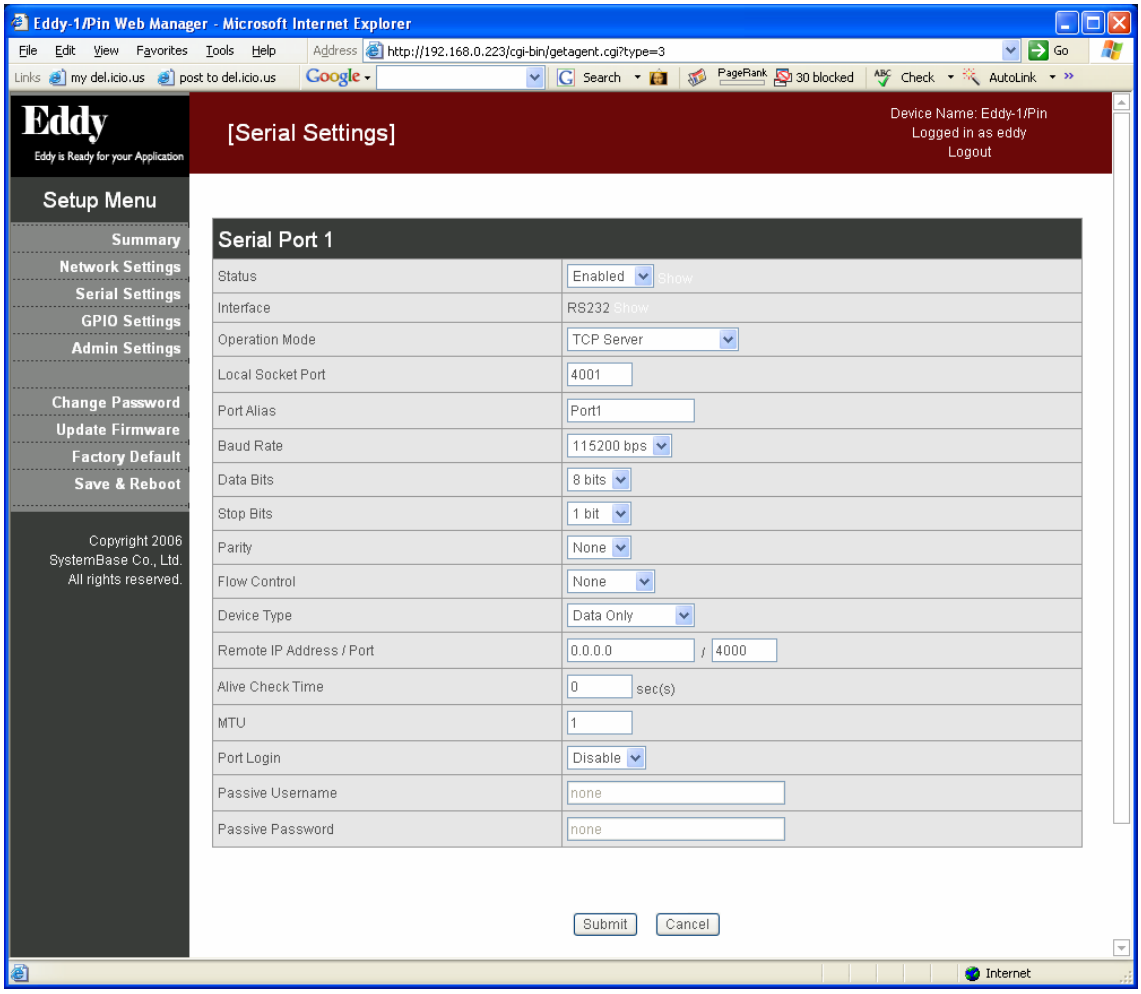
  Set the location name for management. 32 Characters at maximum.

- **Group** (Default: None)

  Set the group name for management. 32 Characters at maximum.

4. Serial Settings

You can set the communication and operation environment for the serial port. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to '**Save & Reboot**' in order to see these changes in effect. Changes will be discarded if you do not save current settings.



- **Status** (Default: Enabled)

  Options: Enabled / Disabled

  Choose to use or not use this port.

- **Interface** (Default: RS232)

  Options: RS232 / RS422 / RS485

  Current serial interface type is displayed. Refer to Chapter 3. Hardware for detailed information on changing serial interface type.

- **Local Socket Port** (Default: 4001)

  Set the socket number for the port. TCP server and UDP server operation mode makes use of this port for awaiting network socket connections.

- **Port Alias** (Default: Port1)

  Port alias name for convenience. 16 Characters at maximum.

- **Operation Mode** (Default: COM(Win200x/XP))

  Select the operation protocol, which the serial port would use.

  → **COM(Win200x/XP)**

  Use the serial port of Eddy as the COM ports of Windows 2000/XP/2003 operated PC. (Both the data and the signal line information of the serial port can be controlled.)

  → **COM(Win98/ME)**

  Use the serial ports of Eddy as the COM ports of Windows 98/ME operated PC. (Both the data and the signal line information of the serial port can be controlled.)

  → **TCP Server**

  Eddy works as a socket server, waiting for the client connection on the network.
  Socket number for awaiting connections can be set in 'Local socket port' field.
  All data between the socket and the serial port is transferred untouched after the socket connection is established.

  → **TCP Client**

  Eddy acts as a socket client in this mode. It tries to connect to the server IP address and the socket number assigned when a certain server waits for connection on the network.
  All data between the socket and the serial port is transferred untouched after the socket connection is established.

  → **TCP Multi-Server**

  Eddy works as a server, accepting up to 5 simultaneous connections from socket clients.
  Data transmitted from Eddy is broadcast to each socket client.

  → **UDP Server**

  Eddy works as a UDP server, waiting for UDP connection from the client on the network.
  Socket number for awaiting connections can be set in 'Local socket port' field.

Once a UDP packet is received to the socket that waits for the connection, the data is transmitted to the serial port. The data input from the serial port is put into UDP packets, which eventually are sent to the client.

→ **UDP Client**

When the data is input to the serial port, UDP packets are sent using the preset IP address and the socket number of the server.

- **Baud Rate** (Default: 9600bps)

Options: 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600bps

Set communication speed.

- **Data Bits** (Default: 8)

Options: 5, 6, 7, 8

Set the number of bits in each character size.

- **Stop Bits** (Default: 1)

Options: 1, 2

Set the number of stop bits.

- **Parity** (Default: None)

Options: None, Odd, Even

Set parity bit check scheme.

- **Flow Control** (Default: None)

Options: None, Xon/Xoff, RTS/CTS

Set the flow control scheme.

- **Device Type** (Default: DataOnly)

Options: Data Only, Modem Signals

Set the signal line checking method for the device to be connected to the given serial port.

If the mode is set to Data Only, only Txd, Rxd, and Gnd signal lines are used in inter-device communication. If the mode is set to Modem Signals, all modem signals except RI(Ring Indicator) are asserted, tested, and used in communication.

- **Remote IP Address / Port** (Default: 0.0.0.0 / 4000)

  When the Operation Mode is set to TCP Client, set the IP address and the socket number to connect to.

- **Alive Check Time** (Default: 0 sec)

  After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection. If the value is set to 0, this function is disabled. Valid from 0 to 32767.
  (Only applies to TCP Client, TCP Server, TCP Multi-Server operation modes.)

- **MTU** (Default: 1 byte)

  MTU stands for Maximum Transmission Unit, and this option needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once. If 100 bytes of character string are to be transmitted from the serial device and MTU is set to '100', Eddy waits until the entire 100 bytes are received. After receiving 100 bytes, it transmits this data to the server as a single packet, using the socket. If 200 bytes of character string are to be transmitted from the serial device, Eddy breaks this data into 2 packets of 100 bytes. If MTU is set to '1', however, each byte is transmitted right away in a packet, therefore multiple packets sent to the server. Valid from 1 to 1100.

- **Port Login** (Default: Disable)

  Options: Enable, Disable
  When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect.

- **Passive Username** (Default: conuser)

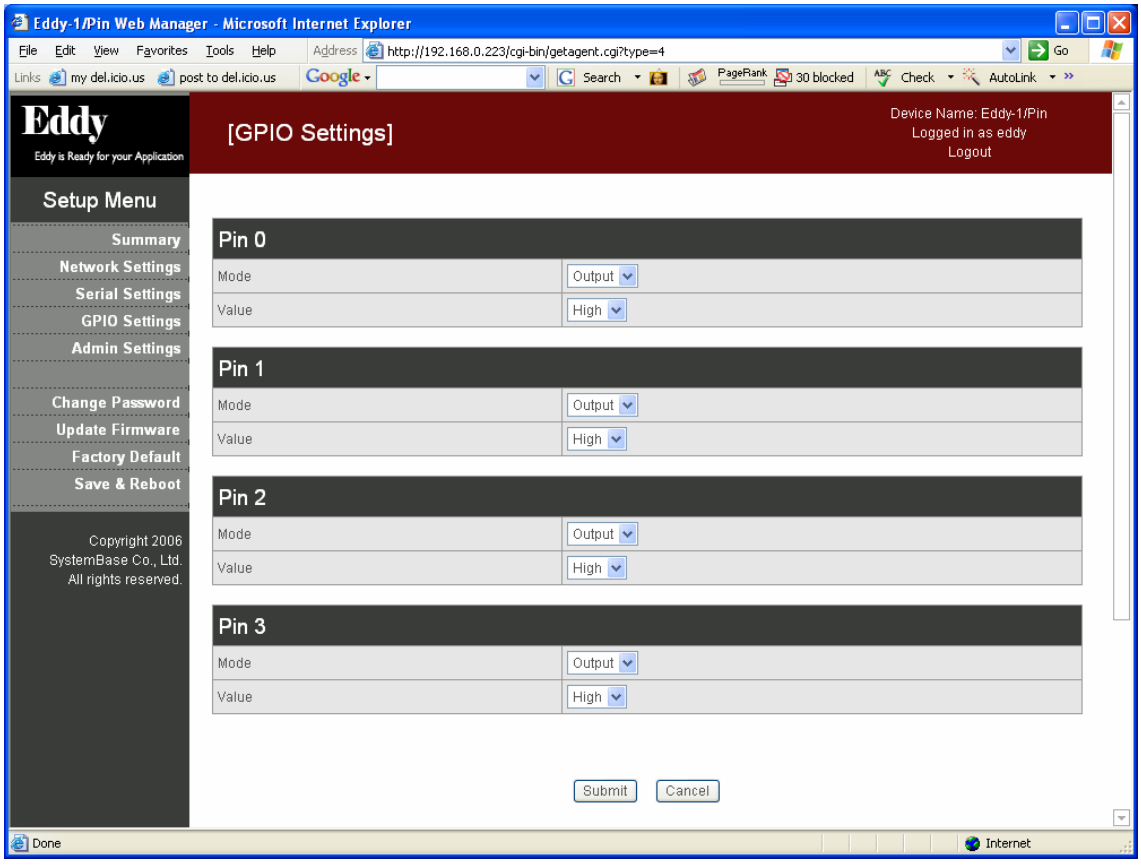
  When the Operation Mode is set to TCP Server, set the username to ask for. 32 Characters at maximum.

- **Passive Password** (Default: 99999999)

  When the Operation Mode is set as TCP Server, set the password to ask for. 32 Characters at maximum.

5. GPIO Settings

Configure operation mode and value for each Programmable I/O pins. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to '**Save & Reboot**' in order to see these changes in effect. Changes will be discarded if you do not save current settings.



- **Mode** (Default: Output)

  Options: Output, Input

  Set current pin's I/O mode.

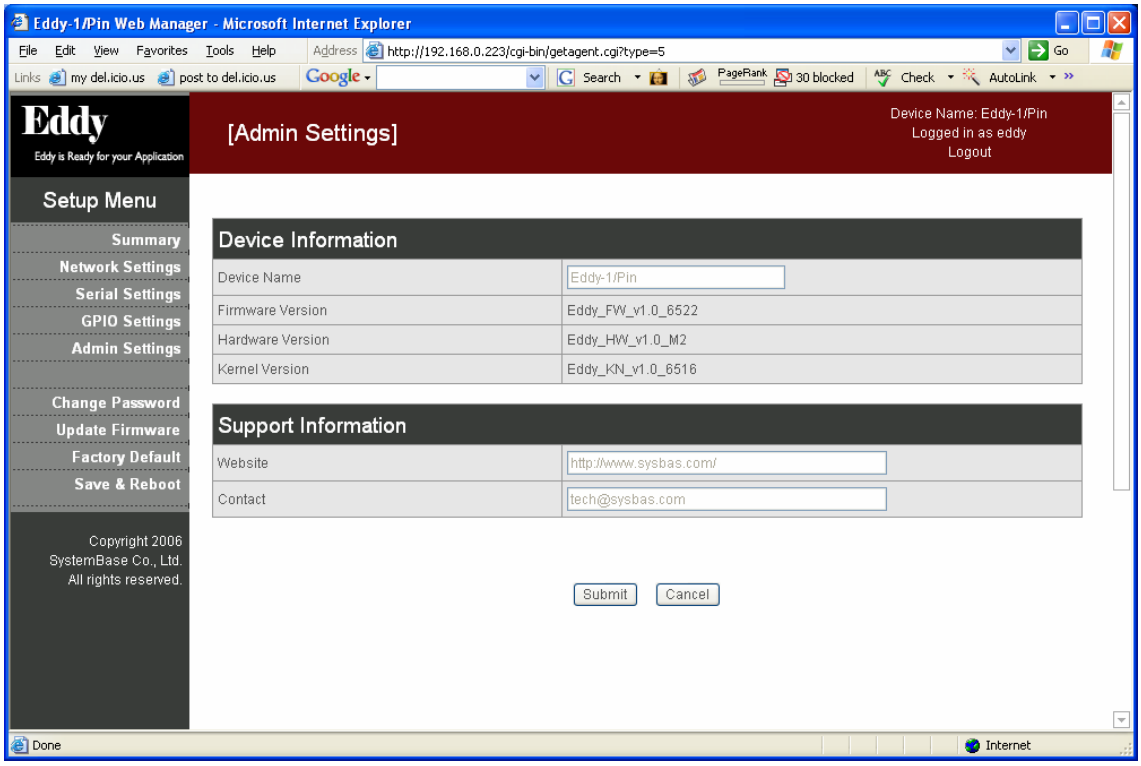
- **Value** (Default: High)

  Options: High / Low

  Set current pin's output value. (This option only applies to output mode pins)

6. Admin Settings

Device information and support information settings. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to '**Save & Reboot**' in order to see these changes in effect. Changes will be discarded if you do not save current settings.



Device Information

- **Device Name** (Default: Eddy-1/Pin)

  Name of the current device.

- **Firmware Version**

  Current firmware version.

- **Hardware Version**

  Current hardware version.

- **Kernel Version**

  Current kernel version.

Support Information

- **Website**

  Website for help and support.

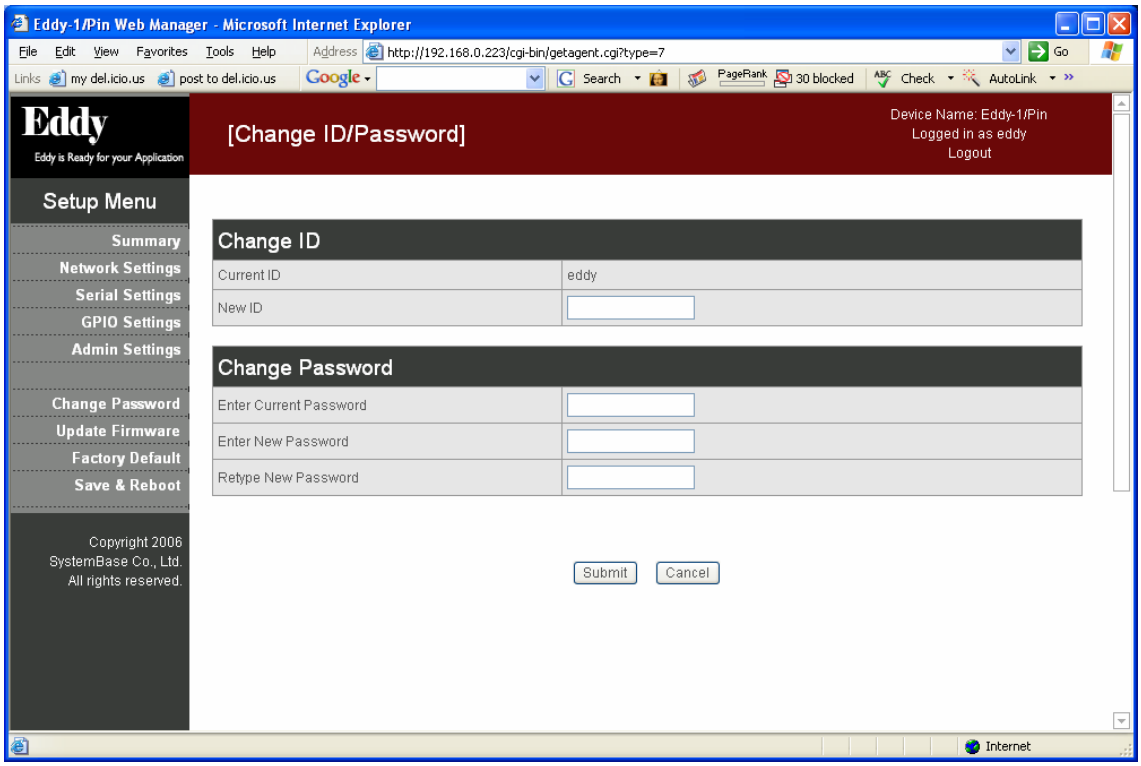
- **Contact**

  Contact information for technical support.

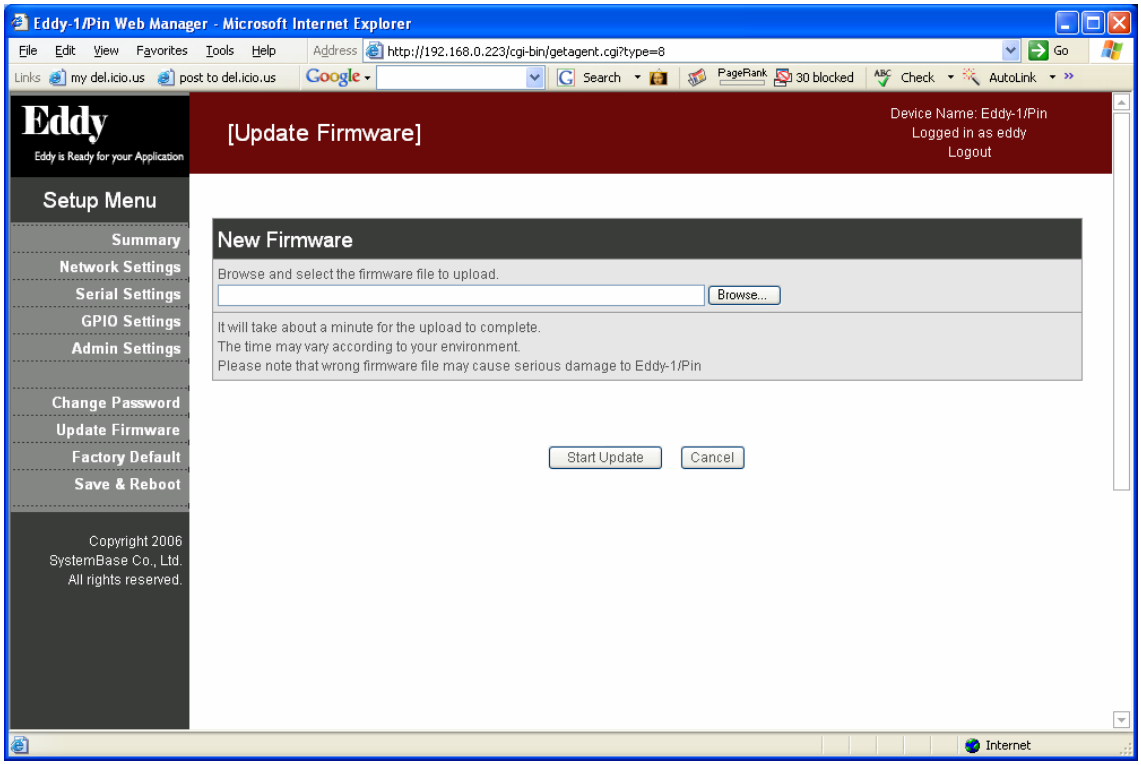
7. Change Password

Change Web/Telnet access username and password. After changing values, you need to click 'Submit' button. Then you will see the same page with modified values. Please note that you have to '**Save & Reboot**' in order to see these changes in effect. Changes will be discarded if you do not save current settings.

As stated before, default username and password are **eddy** and **99999999**, respectively.



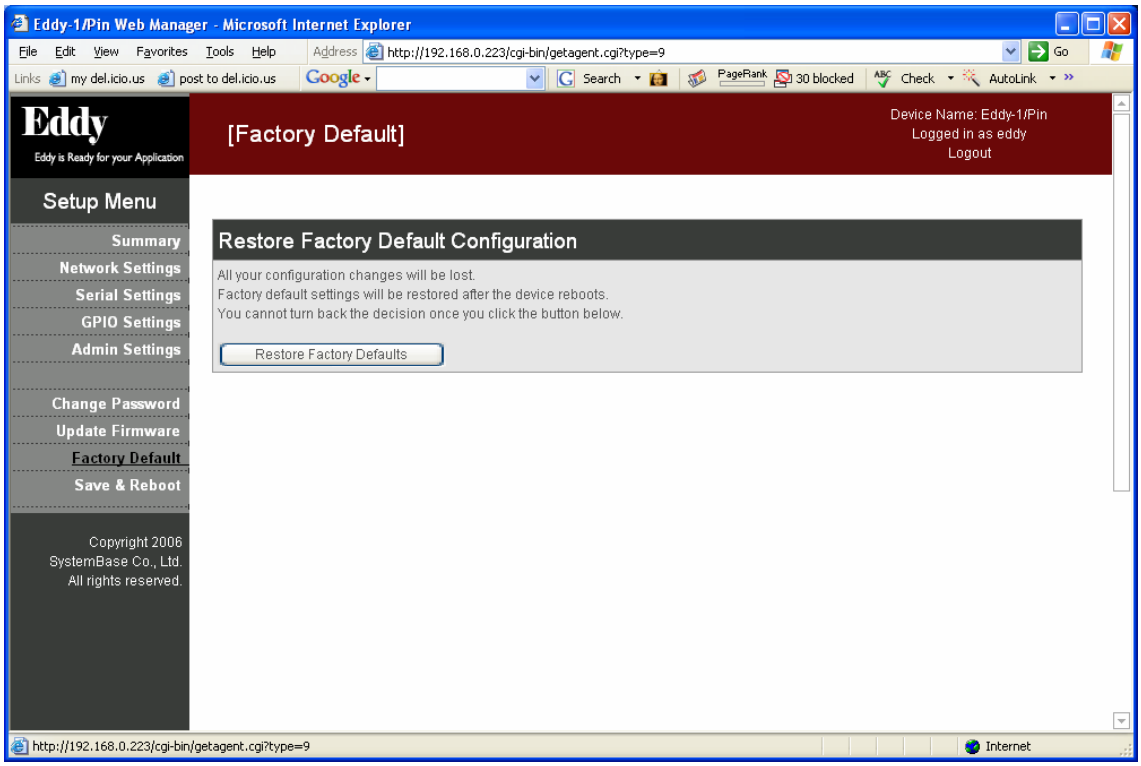
8. Update Firmware



Firmware is an application embedded in Flash memory of Eddy. Set the location of the firmware file to update, using the 'Browse…' button. The selected firmware will be transferred to Eddy when you click 'Start Update'. After the transmission is complete, Eddy will be automatically restarted to operate with the new firmware. Recent firmware can be downloaded at the SystemBase web site, http://www.sysbas.com/

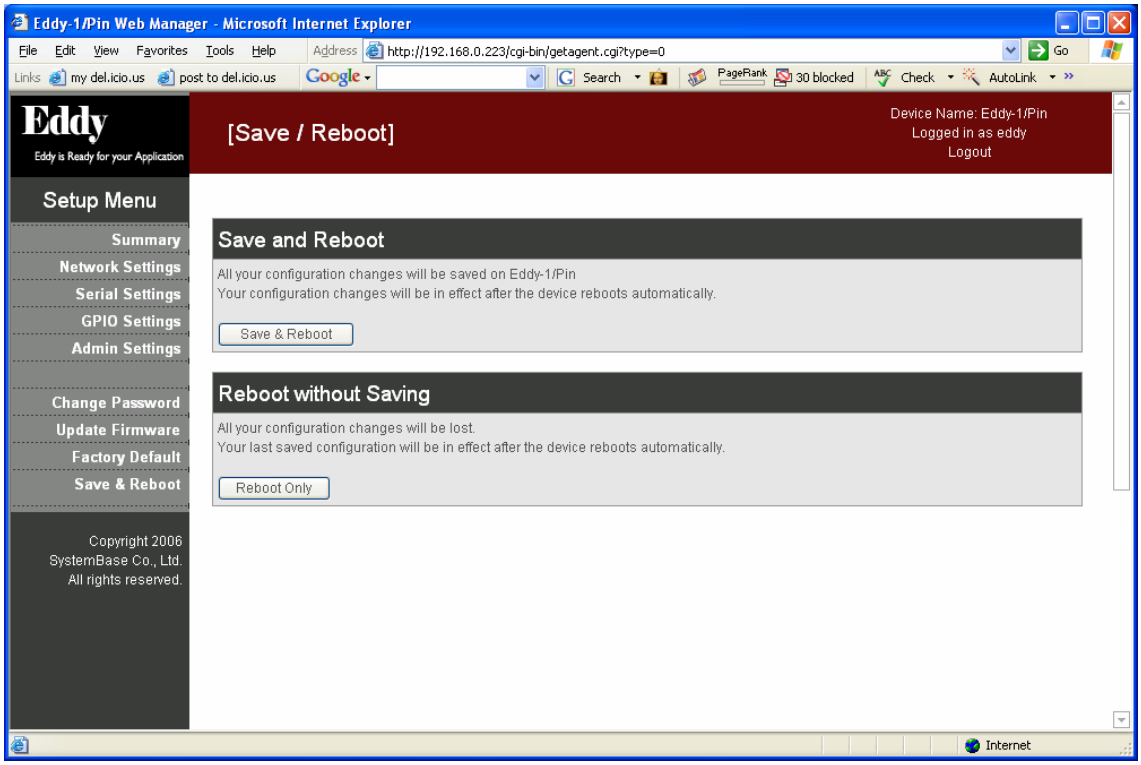
9. Factory Default

Restore all the configuration parameters to the factory default values. Clicking on 'Restore Factory Defaults' button will delete all current settings and restore settings to the initial status. Eddy will automatically reboot. You cannot turn back the decision once you select this option.



10.Save & Reboot

This option saves changes to the Flash memory and restarts the system to let the changes to take place in the operation.



- **Save and Reboot**

  'Save & Reboot' reboots Eddy after saving changes to Flash memory.

- **Reboot without Saving**

  'Reboot Only' option just reboots Eddy without saving changes. This option can be used to rollback the changes you have mistakenly made.

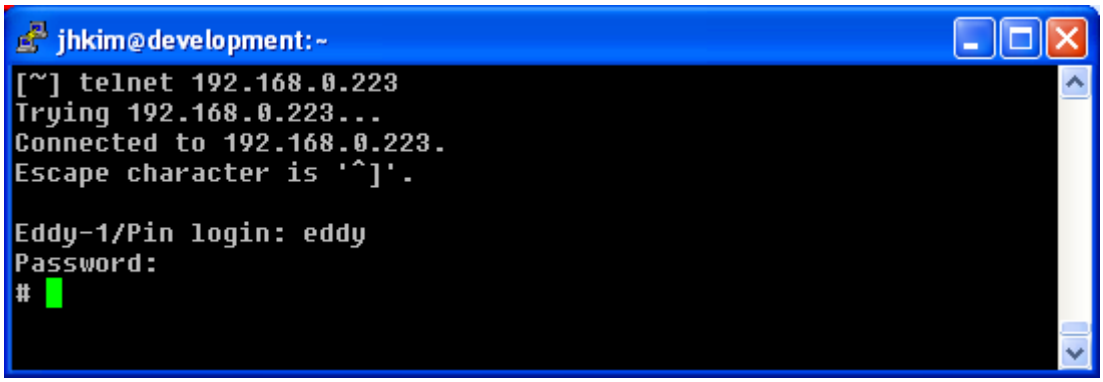
Chapter 6. Configuration via Telnet

1. Connection

Open your telnet client and enter Eddy's IP address to connect. You need to enter appropriate username and password to login. Please note that this username and password is used as authentication method for Web as well. This means if username or/and password has been modified from the telnet interface, modified values have to be entered to connect to web, and vice versa.

Factory default username: **eddy**

Factory default password: **99999999**



With '**set**' commands, you can configure Eddy's settings.

With '**view**' commands, you can view current Eddy's settings.

After changing values, you can see modified values with 'view' commands. But be careful because these values are not in effect unless you issue a '**set save**' command. Changes will be discarded if you do not save current settings.

Command notations:

1) set line [ip / dhcp]: Either enter **set line ip** or **set line dhcp**.
2) set ip <IP address>: Enter actual values such as **set ip 192.168.0.223**

2. View Commands

- **view**

  Show summarized information about Eddy.
- **view all**

  Show all available information about Eddy.
- **view server**

  Show network and device server's settings.
- **view port**

  Show serial port settings.
- **view gpio**

  Show GPIO pin settings.
- **view version**

  Show version and support information.
- **view command**

  Show 'set' command list.
- **view help**

  Show 'view' command list.

3. Network Commands

Configure general network environment and network management.

General Configuration

- **set line [ip / dhcp]** (Default: Static IP)

  IP obtaining method for Eddy's network connection

- **set ip <IP Address>** (Default: 192.168.0.223)

  Set the current IP address Eddy is assigned to.

  When line type is Static IP, manually enter an appropriate IP address.

  When line type is DHCP, it is not editable.

- **set mask <Subnet mask>** (Default: 255.255.255.0)

  Set the subnet mask Eddy is assigned to.

  When line type is Static IP, manually enter an appropriate subnet mask.

  When line type is DHCP, it is not editable.

- **set gateway <Gateway address>** (Default: 192.168.0.1)

  Set the default gateway Eddy is assigned to.

  When line type is DHCP, it is not editable.

- **set snmp [Enable / Disable]** (Default: Disable)

  Enable or disable SNMP(Simple Network Management Protocol) support.

  MIB-II (RFC 1213): System, Interface, IP, ICMP, TCP, UDP

  MIB-I (RFC 1317): Serial Interface

NMS Configuration

If multiple devices are installed and managed together, integration in management is necessary. In addition, it is often the case when the device reports an erroneous status, figuring out the reason for the failure becomes a time-consuming job. To solve this inefficiency and provide better solution, Eddy includes a Network Management System software, Portview.

- **set nms <IP address>** (Default: 0.0.0.0)

  If IP is set to 0.0.0.0, NMS feature is disabled.

- **set nport <Port number>** (Default: 4000)

  NMS socket number (if NMS is used)

- **set name** (Default: Eddy-1/Pin)

  Set the device name for management. 32 Characters at maximum.

- **set location** (Default: None)

  Set the location name for management. 32 Characters at maximum.

- **set group** (Default: None)

  Set the group name for management. 32 Characters at maximum.

4. Serial Commands

You can set the communication and operation environment for the serial port.

- **set port 1 status [Enable / Disable]** (Default: Enable)

  Choose to use or not use this port.

- **set port 1 <port number>** (Default: 4001)

  Set the socket number for the port. TCP server and UDP server operation mode makes use of this port for awaiting network socket connections.

- **set port 1 name <name>** (Default: Port1)

  Port alias name for convenience. 16 Characters at maximum.

- **set port 1 protocol [com2kxp / com98 / tcp_server / tcp_client / tcp_mserver / udp_server / udp_client]** (Default: com2kxp)

  Select the operation protocol, which the serial port would use.

  → **com2kxp**

  Use the serial port of Eddy as the COM ports of Windows 2000/XP/2003 operated PC. (Both the data and the signal line information of the serial port can be controlled.)

  → **com98**

  Use the serial ports of Eddy as the COM ports of Windows 98/ME operated PC. (Both the data and the signal line information of the serial port can be controlled.)

  → **tcp_server**

  Eddy works as a socket server, waiting for the client connection on the network.
  Socket number for awaiting connections can be set in 'Local socket port' field.
  All data between the socket and the serial port is transferred untouched after the socket connection is established.

  → **tcp_client**

  Eddy acts as a socket client in this mode. It tries to connect to the server IP address and the socket number assigned when a certain server waits for connection on the network.
  All data between the socket and the serial port is transferred untouched after the socket connection is established.

  → **tcp_mserver**

  Eddy works as a server, accepting up to 5 simultaneous connections from socket clients.

Data transmitted from Eddy is broadcast to each socket client.

→ **udp_server**

Eddy works as a UDP server, waiting for UDP connection from the client on the network. Socket number for awaiting connections can be set in 'Local socket port' field.

Once a UDP packet is received to the socket that waits for the connection, the data is transmitted to the serial port. The data input from the serial port is put into UDP packets, which eventually are sent to the client.

→ **udp_client**

When the data is input to the serial port, UDP packets are sent using the preset IP address and the socket number of the server.

- **set port 1 speed [150 / 300 / 600 / 1200 / 2400 / 4800 / 9600 / 19200 / 38400 / 57600 / 115200 / 230400 / 460800 / 921600]** (Default: 9600bps)

Set communication speed.

- **set port 1 data [5 / 6 / 7 / 8]** (Default: 8)

Set the number of bits in each character size.

- **set port 1 stop [1 / 2]** (Default: 1)

Set the number of stop bits.

- **set port 1 parity [none / odd / even]** (Default: none)

Set parity bit check scheme.

- **set port 1 flow [none / xon / rts]** (Default: none)

Set the flow control scheme.

- **set port 1 signal [data / modem]** (Default: data)

Set the signal line checking method for the device to be connected to the given serial port.

If the mode is set to data (Data Only), only Txd, Rxd, and Gnd signal lines are used in inter-device communication. If the mode is set to modem (Modem Signals), all modem signals except RI(Ring Indicator) are asserted, tested, and used in communication.

- **set port 1 remote <IP address>** (Default: 0.0.0.0)

When the Operation Mode is set to TCP Client, set the IP address to connect to.

- **set port 1 rport <socket number>** (Default: 4000)

  When the Operation Mode is set to TCP Client, set the socket number to connect to.

- **set port 1 keepalive <0 ~ 32767>** (Default: 0 sec)

  After a certain amount of time passes without any communication after the socket connection between the given serial port and the server is established, automatically disconnect the socket connection. If the value is set to 0, this function is disabled.

  (Only applies to TCP Client, TCP Server, TCP Multi-Server operation modes.)

- **set port 1 mtu <1 ~ 1100>** (Default: 0)

  MTU stands for Maximum Transmission Unit, and this option needs to be set when consecutive data from the given serial port needs to be transmitted to socket at once. If 100 bytes of character string are to be transmitted from the serial device and MTU is set to '100', Eddy waits until the entire 100 bytes are received. After receiving 100 bytes, it transmits this data to the server as a single packet, using the socket. If 200 bytes of character string are to be transmitted from the serial device, Eddy breaks this data into 2 packets of 100 bytes. If MTU is set to '1', however, each byte is transmitted right away in a packet, therefore multiple packets sent to the server.

- **set port 1 uselogin [0 / 1]** (Default: 0-Disable)

  When the Operation Mode is set to TCP Server, ask for the username and password when the client tries to connect. Set to 1 to enable.

- **set port 1 conusername <username>** (Default: conuser)

  When the Operation Mode is set to TCP Server, set the username to ask for.

- **set port 1 conpassword <password>** (Default: 99999999)

  When the Operation Mode is set as TCP Server, set the password to ask for.

5. GPIO Commands

Configure operation mode and value for each Programmable I/O pins.

- **set gpio <0~3> mode [in / out]** (Default: Output)
  Set current pin's I/O mode.

- **set gpio <0~3> value [low / high]** (Default: High)
  Set current pin's output value. (This option only applies to output mode pins)

6. Username/Password Commands

Configure username and password for Web/Telnet.

- **set user <username>** (Default: eddy)
  Set username. 16 Characters at maximum.

- **set pass <password>** (Default: 99999999)
  Set password. 16 Characters at maximum.

7. System Commands

- **set default**
  Restore all settings to factory default. Requires reboot for changes to take effect.

- **set save**
  Save current configuration settings. Requires reboot for changes to take effect.

- **reboot**
  Reboot Eddy.

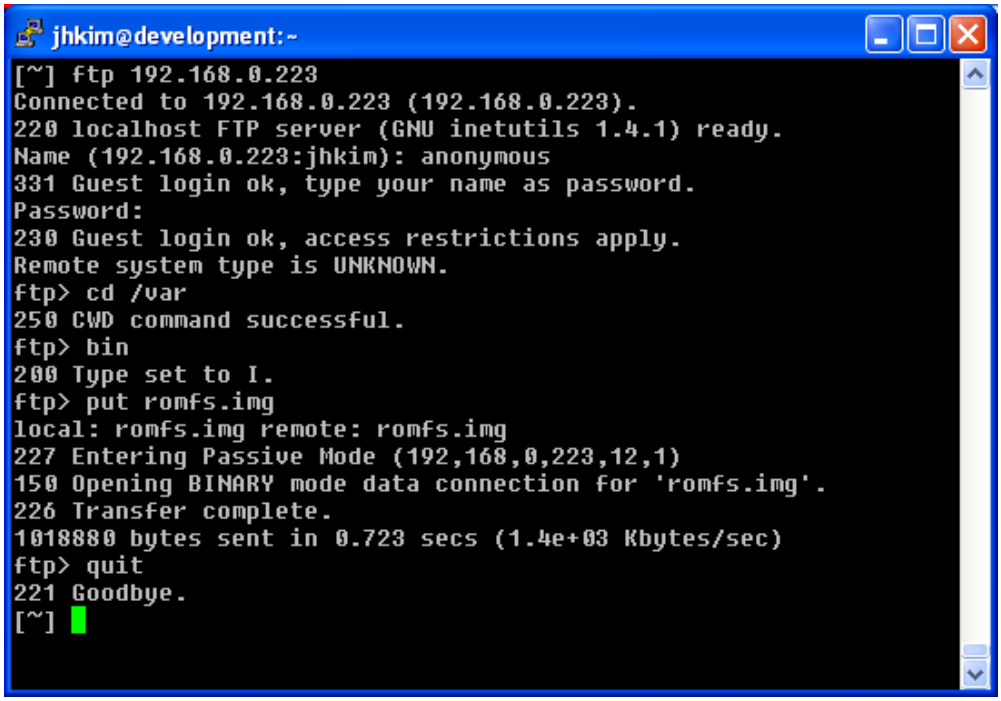
Chapter 7. Appendix

1. Firmware Update

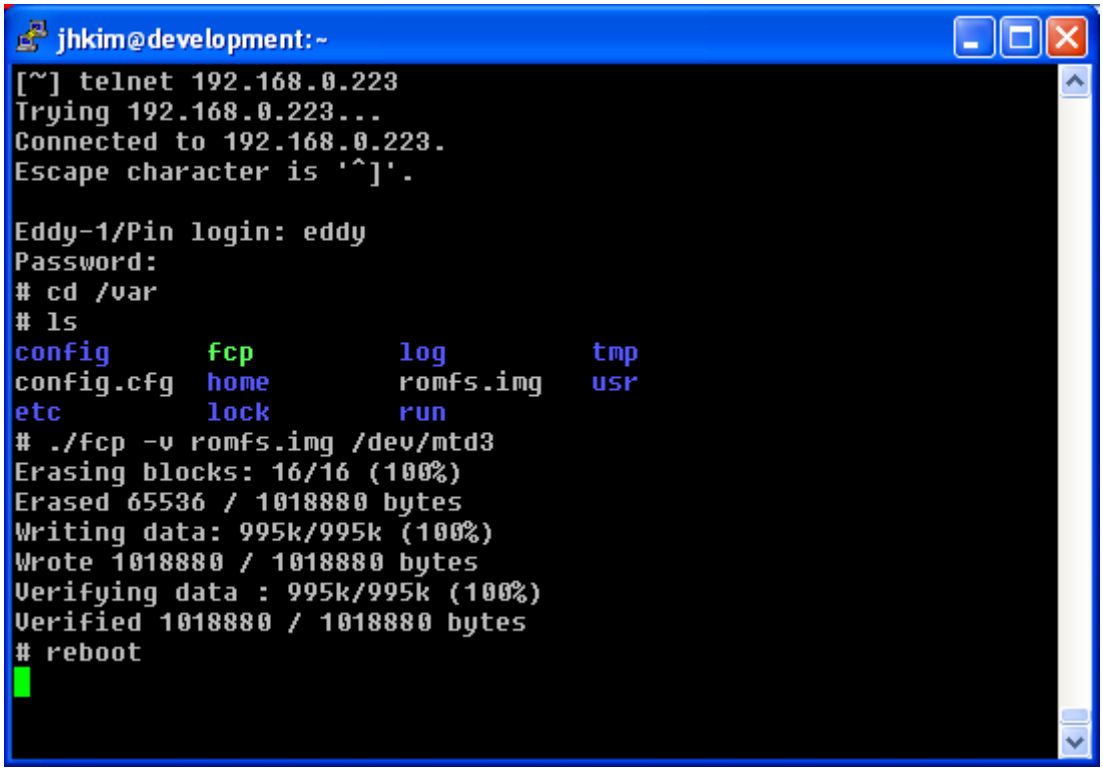
Eddy supports firmware update with Web, FTP, and TFTP. This section describes update method via FTP and TFTP. Web update is described in Chapter 5. Configuration via Web.

Update via FTP

1. First, connect to Eddy via ftp command. You can also use GUI-style FTP clients.
2. Enter **anonymous** for username. Password is not required, so just leave it blank.
3. Issue a command '**cd /var**' to move to a /var directory where firmware can be uploaded. Please note that write attempts to any other directories are restricted for security reasons.
4. Issue a command '**bin**' for binary mode.
5. Issue a command '**put romfs.img**' to start upload. romfs.img file must be in the same directory with current directory where you are running the ftp command.
6. After getting a 'Transfer complete' message, issue a command '**quit**' to disconnect.

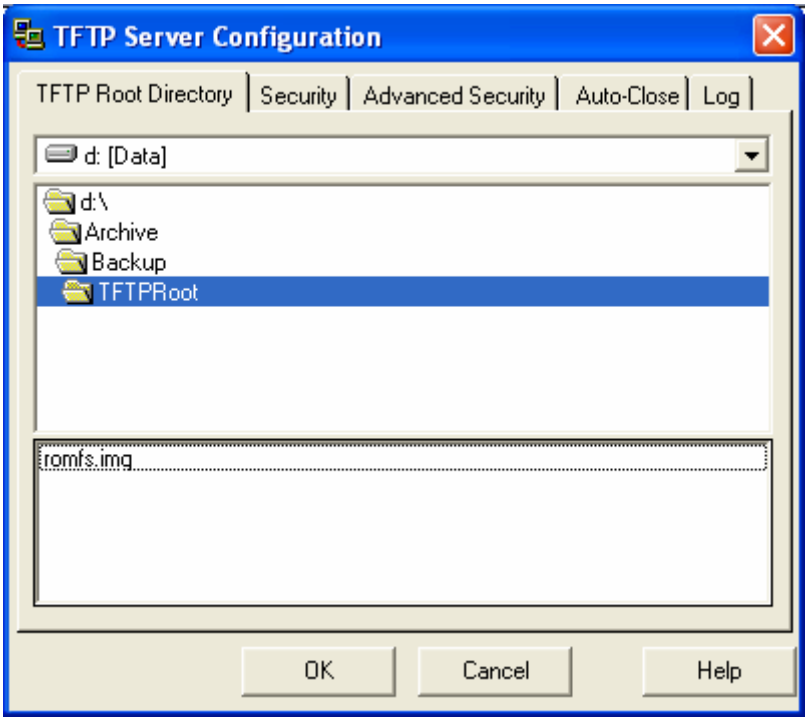

jhkim@development:~
[~] ftp 192.168.0.223
Connected to 192.168.0.223 (192.168.0.223).
220 localhost FTP server (GNU inetutils 1.4.1) ready.
Name (192.168.0.223:jhkim): anonymous
331 Guest login ok, type your name as password.
Password:
230 Guest login ok, access restrictions apply.
Remote system type is UNKNOWN.
ftp> cd /var
250 CWD command successful.
ftp> bin
200 Type set to I.
ftp> put romfs.img
local: romfs.img remote: romfs.img
227 Entering Passive Mode (192,168,0,223,12,1)
150 Opening BINARY mode data connection for 'romfs.img'.
226 Transfer complete.
1018880 bytes sent in 0.723 secs (1.4e+03 Kbytes/sec)
ftp> quit
221 Goodbye.
[~]

7. Now connect to Eddy with Telnet.
8. Enter your username and password.
9. After receiving a prompt, issue a command '**cd /var**' to move to the directory with firmware.
10. Issue a command '**ls**' to make sure uploaded firmware file (**romfs.img**) resides in this directory.
11. Issue a command '**./fcp –v romfs.img /dev/mtd3**' to start writing a new firmware to the memory.
12. Check if Erase / Write / Verity process is successful.
13. Issue a command '**reboot**' to reset Eddy with a new firmware.



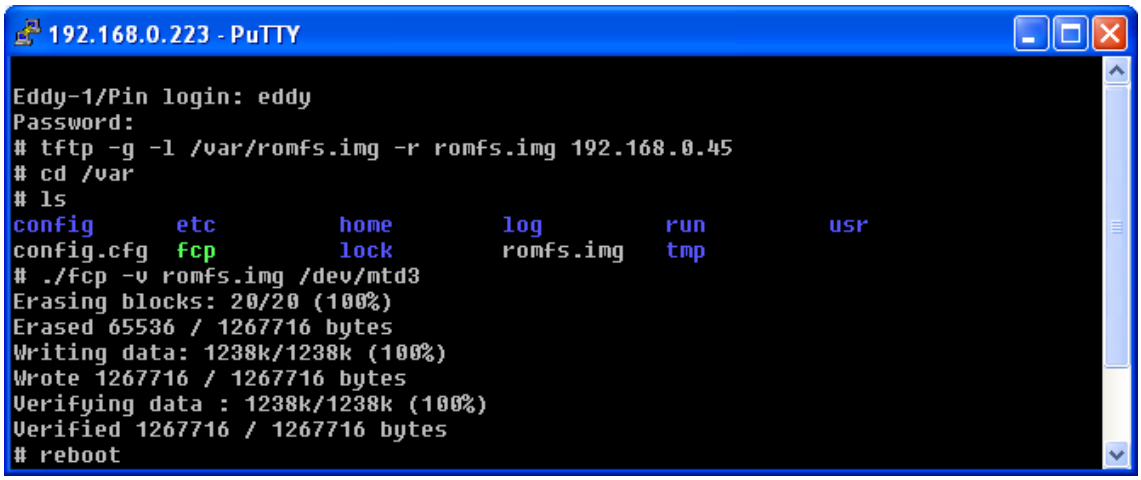
Update via TFTP

1. You need a TFTP server on your PC. There are various freeware, so install any TFTP server software of your choice.
2. Make sure your firmware resides in the TFTP Root directory that you set in your TFTP server configuration.



3. Now connect to Eddy with Telnet.
4. Enter your username and password.
5. After receiving a prompt, issue a command

   '**tftp –g –l /var/romfs.img –r romfs.img 192.168.0.45**' where –l /var/romfs.img refers to the local firmware location (Eddy) and –r romfs.img refers to the firmware filename that is in TFTP Root directory at TFTP server (PC). The last argument is the TFTP server's IP address (PC).
6. You get no output if TFTP transmission is successful. Issue a command '**cd /var**' to move to the directory with firmware.
7. Issue a command '**ls**' to make sure uploaded firmware file (**romfs.img**) resides in this directory.
8. Issue a command '**./fcp –v romfs.img /dev/mtd3**' to start writing a new firmware to the memory.
9. Check if Erase / Write / Verity process is successful.
10. Issue a command '**reboot**' to reset Eddy with a new firmware.


192.168.0.223 - PuTTY
Eddy-1/Pin login: eddy
Password:
tftp -g -l /var/romfs.img -r romfs.img 192.168.0.45
cd /var
ls
config etc home log run usr
config.cfg fcp lock romfs.img tmp
./fcp -v romfs.img /dev/mtd3
Erasing blocks: 20/20 (100%)
Erased 65536 / 1267716 bytes
Writing data: 1238k/1238k (100%)
Wrote 1267716 / 1267716 bytes
Verifying data : 1238k/1238k (100%)
Verified 1267716 / 1267716 bytes
reboot

2. Technical Specifications

Communication

LAN

Port	1 (RJ-45)
Speed	10/100Mbps Auto-Sensing
Connection	DHCP, Static IP
Protocols	TCP, UDP, Telnet, ICMP, DHCP, FTP, TFTP, HTTP, SNMP 1&2

Serial

Port	1 (14 + 10 Pin Header)
Speed	300bps to 921.6Kbps
Interface	RS232 / 422 / 485 Selectable by pins
Signals	Tx, Rx, DTR, DSR, RTS, CTS, DCD
UART	Standard 16C550
Data Bits	5, 6, 7, 8
Stop Bits	1, 2
Parity	None, Even, Odd
Flow Control	None, RTS/CTS(software), Xon/Xoff(hardware)

Software

Operating System	Embedded Linux (Kernel 2.4.x)
Management	SNMP, Portview, Web
Configuration	Portview, Web, Telnet
Firmware Update	Web, FTP, TFTP
Security	Web/Telnet Username & Password
COM Port Redirection	SystemBase COM Port Redirector for Windows 98/ME/2K/XP/2003

Hardware

Processor	ARM 940 32-bit Processor with 168MHz Clock
Flash Memory	4MB
SDRAM	8MB
LED	100 Base-Tx Link, LAN Tx
Power Input	3.3V
Power Usage	260mA

Dimensions	55 * 38 mm
Weight	19g

Environmental

Operating Temp.	0 ~ 50˚C
Storage Temp.	-20 ~ 80˚C
Humidity	5 ~ 95% Non-Condensing

Approvals

CE Class A, FCC Class A

RoHS Compliant

Development Kit

Connectors	Module Mount, DB9(RS232), 5P Terminal Block(RS422/485),
USB	For Flash Programming Only
Switches	Interface Select and Terminal Resistor
Reset	Hardware Reset Button
LED	Power, Ready, 4 * GPIO, LAN link,
	Serial: Tx, Rx, DCD, DTR, DSR, RTS, CTS, RS232, RS422, RS485
Dimensions	110 * 80 mm

Ordering Information

Eddy-1/Pin	Embedded device server module with pin header serial connector
Eddy-1/Pin Development Kit	Development kit for Eddy-1/Pin

3. FCC Statement

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC FULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

FCC RF

INTERFERENCE STATEMENT

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.